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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,890	02/17/2004	Stephen Shaughnessy	MDSP-P04-180	1480

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EXAMINER	
KEMMERER, ELIZABETH	
ART UNIT	**PAPER NUMBER**
1646	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/779,890	SHAUGHNESSY ET AL.	
	Examiner	Art Unit	
	Elizabeth C. Kemmerer, Ph.D.	1646	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,40 and 49-53* is/are pending in the application.

4a) Of the above claim(s) *4-10 and 14-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,11-13,28,40 and 49-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/715,838.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/17/04, 9/15/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

Applicant's election of Group III (claims 1-3, 11-13, 28, 40, and 49-53) in the reply filed on 10 October 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 4-10 and 14-27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10 October 2006.

Status of Application, Amendments, And/Or Claims

The preliminary amendments of 17 February 2004, 09 February 2006, and 22 January 2007 have been entered in full. Claims 29-39 and 41-48 are canceled. Claims 4-10 and 14-27 are withdrawn from further consideration as discussed above. Claims 1-3, 11-13, 28, 40, and 49-53 are under examination.

Sequence Rules

The amendment to the claims adding sequence identifiers (22 January 2007) is acknowledged. However, the application still fails to comply with the sequence rules, 37 CFR 1.821-1.825, because each disclosure of a sequence embraced by the definitions set forth in the rules is not accompanied by the required reference to a sequence

identifier (i.e., SEQ ID NO:). This occurs in the specification at least at p. 38. Compliance with the sequence rules is required.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: osteoporosis treatment with IL-11 binding peptides.

35 U.S.C. §§ 101 and 112, Second Paragraph – "Use" claims

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 40 provides for the use of a peptide, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced. Furthermore, claim 40 is indefinite for depending from a canceled claim.

Claim 40 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper

definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

35 U.S.C. § 112, First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 11-13, 20, 40, and 49-53 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for methods of increasing bone density and/or decreasing bone resorption in a patient comprising administering an IL-11 binding peptide comprising SEQ ID NO: 1 or SEQ ID NO: 6, optionally wherein the patient suffers from osteoporosis, myeloma, Paget's disease, or bone fracture, does not reasonably provide enablement for methods using other Il-11 binding peptides, or methods of treating metastatic bone cancer. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

Factors to be considered in determining whether a disclosure enables one skilled in the art to make and use the claimed invention in its full scope without resorting to undue experimentation include: (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature or complexity of the invention; (5) the state of the prior art; (6)

the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. See *In re Wands*, 8 USPQ2d. 1400 (Fed. Cir. 1988).

In the instant case, the nature of the invention is complex and unpredictable, involving regulation of bone growth with biological molecules. As was found in Ex parte Hitzeman, 9 USPQ2d 1821 (BPAI 1987), a single embodiment may provide broad enablement in cases involving predictable factors such as mechanical or electrical elements, but more will be required in cases that involve unpredictable factors such as most chemical reactions and physiological activity. See also In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970); Amgen Inc. v. Chugai Pharmaceutical Co. Ltd., 927 F.2d 1200, 1212, 18 USPQ2d 1016, 1026 (Fed. Cir.), cert. denied, 502 U.S. 856 (1991).

The specification provides guidance regarding how to make IL-11 binding peptides and test them for activity on bone growth. In addition, working examples are provided that show that the IL-11 binding peptide of SEQ ID NOS: 1 and 6 have the desired activity on bones, whereas SEQ ID NO: 2 does not (pp. 37-38). SEQ ID NO: 2 differs from SEQ ID NO: 1 by the deletion of seven N-terminal amino acids (SEQ ID NO: 5) and the addition of seven amino acids to the C-terminus. Since SEQ ID NO: 1 had the desired activity and SEQ ID NO: 2 did not, the specification asserts that the seven amino acid N-terminal sequence (SEQ ID NO: 5) is all that is needed for the desired activity. However, this is a false conclusion. The reason that SEQ ID NO: 2 fails to have the desired activity could just as easily be due to the additional seven amino acids on the C-terminus of SEQ ID NO: 2 having an inhibitory effect. Also, it is possible that

the sequences necessary for the desired activity are longer than the seven amino acids. For the sake of argument, consider the possibility that the first fourteen amino acids of SEQ ID NO: 1 are required for activity. SEQ ID NO: 2 deletes seven of these fourteen, and thus does not have activity. In this scenario, SEQ ID NO: 5 also would not be expected to have activity, since it is also missing seven of the required fourteen amino acid residues. Finally, it is well known that peptides are active when they are folded into a three-dimensional configuration. The first seven amino acids of SEQ ID NO: 1 may be important for the proper three-dimensional configuration, but may not be sufficient for activity when isolated from the rest of the amino acids of SEQ ID NO: 1. See US 6777539 which describes making nested deletions to clearly identify what residues are needed for a desired activity. Also, PTH and PTHrP are two peptides with overlapping sequences wherein they can have opposite effects on bone resorption (Pilbeam et al., 1993, Bone 14:717-720; see p. 717, second paragraph of Introduction).

In view of the guidance provided in the specification and the state of the art regarding identifying fragments with a desired activity, a large amount of experimentation would be required of the skilled artisan to make and use the claims in their full scope. Although the specification outlines art-recognized procedures for producing and screening for active fragments, this is not adequate guidance as to the nature of active derivatives that may be constructed, but is merely an invitation to the artisan to use the current invention as a starting point for further experimentation. Even if an active or binding site were clearly identified in the specification, they may not be sufficient, as the ordinary artisan would immediately recognize that an active or binding

site must assume the proper three-dimensional configuration to be active, which conformation is dependent upon surrounding residues; therefore deletion of non-essential residues can often destroy activity.

Due to the large quantity of experimentation necessary to determine what amino acid residues are necessary for function, the lack of direction/guidance presented in the specification regarding any active IL-11 binding peptides other than SEQ ID NO: 1 and SEQ ID NO: 6, the absence of working examples directed to the same, the complex nature of the invention, the contradictory state of the prior art, the unpredictability of the effects of biological molecules on physiological processes, and the breadth of the claims, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope.

Finally, regarding treatment of metastatic bone cancer as recited in claim 3, it is noted that metastatic bone cancer is characterized by too much bone growth, and growth of bone-like cancer cells in various places in the body. It makes no sense to administer an agent that promotes bone growth to a patient suffering from metastatic bone cancer since one skilled in the art would expect that such treatment would exacerbate the condition rather than treat it. Due to the large quantity of experimentation necessary to determine how to slow growth of bone-like cancer cells with a bone growth-promoting peptide, the lack of direction/guidance presented in the specification regarding the same, the absence of working examples directed to the same, the complex nature of the invention, the contradictory state of the prior art, the unpredictability of the effects of biological molecules on physiological processes, and

the breadth of the claims, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth C. Kemmerer, Ph.D. whose telephone number is (571) 272-0874. The examiner can normally be reached on Monday through Thursday, 7:00 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Nickol, Ph.D. can be reached on (571) 272-0835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ECK

Elizabeth C. Kemmerer

ELIZABETH KEMMERER
PRIMARY EXAMINER